IN THE DRAWINGS

Applicants propose to correct the drawings by adding the reference numerals indicated in red in the attached figures. The Examiner's approval is sought for these amendments.

IN THE SPECIFICATION

Please amend the paragraph beginning at p. 1, line 7 to read as follows:

A1

> This application is a continuation-in-part of U.S. patent application Serial No. 09/385,167 filed August 30, 1999 (issued as United States Patent No. 6,363,096 on March 26, 2002), which is incorporated herein by reference.

Please amend the paragraph beginning at p. ~~8~~ 2, line ~~18~~ 7 to read as follows:

A2

> There are drawbacks, however, with such one-dimensional gratings, particularly with regard to the directionality of the output light. The direction of the output light naturally affects how well the light may be coupled into receivers or other devices, *e.g.*, planar waveguides and fibers. Both one-dimensional grating couplers and focusing grating couplers have periodicity in a single spatial direction. One-dimensional GCs have straight grooves, whereas focusing GCs, also called grating lenses, have a curvelinear grating. The direction of light output from a coupler is determined by phase-matching the scattered wave to the guided wave. As shown in Fig. 1A, a one-dimensional grating couplers e.g. 1 couple light to a cylindrical wave, necessitating the use of additional optics to direct the light into a fiber. As shown in Fig. 1B, focussing grating couplers e.g. 3 focus light to a point <u>4</u> in space in the vicinity of the grating at a distance on the order of the grating size. With focusing couplers, a receiver may only be placed at a certain fixed distance from the coupler, and in the far field, light is coupled to a spherical wave.

Please amend the paragraph beginning at p. ~~8~~ 14, line ~~18~~ 8 to read as follows:

A3

> Additionally, a plurality of one-dimensional photonic crystal lasers may be integrated with the same coupler. In this

case, the coupler functions as a mixer as well as a coupler. The number of lasers and orientation relative to the coupler should be selected so that the two-dimensional character of the coupler is retained. For example, when a coupler 40 having a two-dimensional triangular lattice of grating elements 9 is used, six lasers may be combined at directions that are 60 degrees apart relative to each other. Such an arrangement is schematically shown in FIG. 7, in which each arrow represents the path of light emitted from a laser that is integrated with the coupler. In this embodiment, all six modes can mix. The parameters of the two-dimensional lattice will affect the number of points in real space that the laser emissions are coupled to. For example, when a two-dimensional lattice with square symmetry is used, mixing and combining of the modes can occur along four directions. With the two-dimensional triangular lattice, six directions may be used, and also, the emissions from all six lasers can be directed vertically, which is advantageous for high-powered lasers.

A3

Please amend the paragraph beginning at p. 15, line 1 to read as follows:

The two-dimensional photonic crystal coupler also may be ensconced within the one-dimensional laser structure. In other words, the coupler can be fabricated as a "defect" in a one-dimensional photonic crystal laser, and the gratings of the one-dimensional photonic crystal laser function as mirrors which create a "resonant cavity coupler." For example, [FIG. 7B shows the index modulation pattern of the composite device where] the two-dimensional photonic crystal coupler can be ensconced between two DBR mirrors. In this case, the two-dimensional coupler is formed with a square lattice. The width of the waveguide (which runs substantially perpendicular to the Bragg mirrors) can be reduced to dimensions that are sufficiently small to function in single mode. The dimension of the waveguide will depend on the wavelength and materials. For example, at a wavelength of 700 nm, a III-IV semiconductor laser can function as a single-mode laser when the width of the waveguide is about 2-3 microns, wherein the "width" denotes the dimension perpendicular to the direction of light propagation and parallel to the plane of the layers (core, cladding, etc.) (*e.g.*, illustrated in FIG. 6A with reference "*w*").

A4